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THE OUTLOOK FOR STATISTICAL SCIENCE IN  
THE UNITED STATES.\*

BY S. N. D. NORTH.

I am glad of the opportunity to supplement President Wright's interesting retrospect with a brief allusion to the present situation and the future outlook for statistical science in this country, and more especially in relation to the statistical work of the government.

I have but one criticism to make upon the address. It resembles the play of "Hamlet," with Hamlet left out. It nowhere hints that Colonel Wright has contributed more to the development of statistical work in the United States, and to its substantial advancement along straight and sane lines, than any other living American. Colonel Wright could not say all this, but I can.

We cannot yet fully realize what a tremendous step forward was taken when the Census Office was made a permanent institution by the act of March 6, 1902. No single thing, save only the requirement for a decennial census in the Federal Constitution, has done so much to promote the study and to perfect the methods of statistics as that legislation, to which Congress consented with the utmost reluctance and with much misgiving.

It will only be after a decennial census has been taken that we can measure the gain that must come in the quality of the work by reason of the existence of the permanent bureau. That the gain will be tangible and real we already know; for a large part of the work of the office has been concentrated during this interval upon a study of weaknesses and defects and upon plans for strengthening the machinery and improving the methods.

\*Address delivered at the annual meeting of the American Statistical Association Jan. 17, 1908.

The bill already introduced in Congress for the taking of the thirteenth census is the first visible result. The bill has received a more careful study by the best statistical experts than was ever before given to a census law.

I believe it has but one serious defect: that is the provision for the appointment of the temporary clerical force after non-competitive examinations rather than through the usual civil service method. The Director ought to be wholly relieved, during the progress of the tremendously difficult work of a decennial census, of all pressure for patronage.

We hope to see it enacted at the present session of Congress. This will be a year earlier than the usual date of census legislation heretofore. This additional year for preparation, by the complete organization of the working machinery, kept alive at its highest efficiency, means a good job, more deliberately and carefully done than was ever possible before.

There has been much speculation as to the margin of error in past censuses. It is customary to reassure the doubters by the statement that one error tends to offset and balance another, giving a net result sufficiently near the truth for all practical purposes. I have always been sceptical as to the soundness of this reasoning. At the next census we may make some discoveries that will be startling. At any rate, we are for the first time in a position where we can intelligently check one census with another.

The permanent Census Office has created a training school for government statisticians. Many of you will recall the remark of General Walker in 1896, that "the government which has spent millions and tens of millions in the collection, compilation, and publication of statistics, had never spent anything in training and preparing the men who should conduct the statistical work of the country." We have an army and a military academy to train men in military science, a navy and a naval academy to prepare men to conduct the service of the navy in war and in peace; but for the development of the science of statistics, the science whose light guides and directs the action of legislature in the shaping of policies that

are to determine the future of the nation, we have simply taken our chances, with a resultant waste which is appalling and an impairment of the validity and accuracy of official statistical data even more appalling.

The permanent Census Office is destined to be our statistical West Point. Already more than twoscore of the best census clerks have gone into other bureaus and departments of the government to engage in various statistical investigations in connection with administrative work,—to the Bureaus of Corporations, of Manufactures, of Forestry, of Labor, and various bureaus of the Department of Agriculture. These statisticians have received a severe and exacting training. Every table or statistical presentation prepared in the office undergoes a merciless criticism and analysis before it reaches the printer. It must be defended, proved, and justified, or be sent back for reconstruction. No university subjects a thesis to more drastic criticism. Most of the clerks who go out after such a training can be trusted to make the most of it in their new fields. I am proud of the record that census-trained clerks are already making in other branches of the government service.

Others have gone into important private posts, still others to State statistical bureaus, and others still to the colleges and universities.

One of the most notable recent developments in higher education is the introduction of the study of statistics as an adjunct to the courses in Political Economy. I know of half a dozen institutions where well-organized statistical courses exist, and no doubt there are more. Many of these university teachers of statistics maintain intimate relations with the Census Office. It is a source of pride to us that census reports are in regular use as text-books.

The relations of the university and the Census Office should be even more intimate than at present. What we now most need is the friendly criticism and suggestion of the trained men, who, through constant use of census reports, come to know their defects. The producers and the consumers of

statistics should be in constant sympathetic co-operation. Helpful suggestions have already come from the consumers. But there should be more of them. There should exist the feeling among the teachers of statistics and of statistical methods that the federal Census Office is not only intended for their use, but is in a large degree dependent upon them for the development of its work along right lines.

Especially should this relationship exist between the Census Office and the American Statistical Association, the one organization in this country whose members are vitally concerned in the work set for us to do. Statistics are your tools. Help us, by friendly criticism and constant suggestion, to keep your tools keen-edged and well tempered, to establish a true standard gauge for the accurate measurement and comparison of the wonderful and multifold conditions of American development.

This is the more important because the Census Office is rapidly coming to be recognized as the general information bureau of the government. The correspondence of the bureau, involving inquiry of one kind and another, is enormous. Fully one-half of it is referred to the census from some other bureau or department. This fact illustrates the confusion which exists in the public mind as to where to apply for statistical information from the government. The statistical work has heretofore been so divided up and the names of the bureaus have been so misleading that the public is utterly at a loss. Letters are sent hit or miss, and the red tape of circumlocution is appalling. For instance, we have a Bureau of Manufactures in the Department of Commerce and Labor and at the same time a Division of Manufactures in the Census Office. The latter takes a complete census of manufacturing industries every five years, and alone can answer the bulk of the inquiries which pour in upon the Bureau of Manufactures. We have a Bureau of Statistics in the Department of Commerce and Labor, which deals only with the statistics of foreign and domestic commerce, and gets thousands of letters which must be referred to the Census. To make confusion more confounded, we have another Bureau

of Statistics in the Department of Agriculture. This bureau is of course concerned only with agricultural investigations, and even in that restricted field it deals not with actual statistics, which only the Census Office compiles, but with yearly crop estimates, which, it is needless to add, are totally different from statistics.

There thus exists a veritable babel in the designations of the bureaus that handle government statistics. This confusion is the outcome of a gradual but disjointed and haphazard development, which was the natural consequence of the fact that prior to the establishment of the permanent Census Office there existed no general statistical bureau to which the accretions of statistical work could appropriately be attached. It is a situation almost grotesque, but one which will gradually right itself. I am glad to be able to inform you that the present Secretary of Commerce and Labor has the problem under consideration, and is about to take an important step for the simplification and clarification of the existing confusion. The law which established the department of Commerce and Labor recognized the fact that this department was to become the chief statistical department of the government. With that end in view it conferred upon the Secretary unusual powers for the consolidation and rearrangement of statistical work. I believe this power is about to be exercised by Secretary Straus in a wise and effective manner.

It is of the utmost importance, in my judgment, that a definite apportionment of the responsibility for the government official statistics should be made. I cannot overstate the need for it, as it is revealed in the daily routine of the Census Office. The daily correspondence confirms another remark of General Walker; *i.e.*, "The American people are intensely and passionately devoted to statistics." They make more frequent use of them, perhaps, than any other people; and, of course, they subject them to every possible misuse. It is their too frequent habit to accept any figures presented in tabular form as "statistics," and to jump at the obvious conclusion. I regard it as no minor function of the permanent Census Office to act as a

check upon this vicious habit. It is immensely important that there shall be an official "hall mark" upon statistical publications: far more important than in the purchase of articles of gold or silver, the value of which is of interest only to a few individuals. It is a part of the duty of the Census Office to furnish the "hall mark" wherever it can and to decline to furnish it wherever it must. There should be some national criterion for all statistics which are labelled "official." This is a function of the permanent Census Office which, so far as I know, has not hitherto been suggested.

By the wise, impartial, and conscientious exercise of this function the standard of statistical accuracy will be materially advanced and the indiscriminate or perverted use of statistics, or of figures purporting to be statistics, greatly restricted. The trust thus imposed upon the Census Office is a grave responsibility. It would work an incalculable injury to the cause of statistical science if anything should happen to impair public confidence in the integrity and reliability of the census; and it is one of the best traditions of this office that its reports should point out and emphasize the limitations and sources of error in the statistics which it compiles, and thus guard against their misinterpretation.

Now a word as to the practical utility of the Census Office during the intercensal years. It makes for more exact statistics to concentrate the statistical work of the government, so far as practicable and wherever separated from administrative functions, in one central bureau, under one general supervision, and with a general unity of method. There must always be exceptions, as in the case of financial statistics, which the Treasury must compile. But what we may call the general, non-administrative statistics of the government—statistics collected primarily for the sake of the knowledge they give of general sociological and economic conditions—can always be handled to the best advantage in one office, whose business it is to do nothing else, which has no executive functions, which is under constant spur to do this one thing better and better, which can measure and test the results secured in one branch of statistical

work by those obtained in others, and can co-ordinate, unify, and verify the whole.

This last is an extremely important consideration. If I should seek the one word which best describes the most useful function of the permanent office, I should call it the standardization of official statistics; and you will permit me briefly to illustrate what I mean. One of the great defects of the statistical work of the government has been not merely the duplication of statistics, but the inconsistency and discrepancy which have existed between statistics on subjects closely related, emanating from different bureaus of the government.

Not all the duplication has disappeared, but it has been greatly curtailed since the establishment of the permanent office.

The inconsistencies and discrepancies have been still more reduced; and the federal statistics harmonize with each other more nearly since the permanent office came into being than ever before. There is still much to be done in this way; and I esteem this one of the most important functions of the permanent office.

The plan pursued to this end is very simple. It rests upon the proposition that the Census Office is a sort of general statistical clearing house for the government. There is hardly a point at which its work does not come in touch, more or less close, with the statistical work done by other government offices. Wherever and whenever this contact arises, it is the policy of the Census Office to get into touch with that other office, and by co-operation, study, comparison, to bring the joint results into harmony.

The statistics of gold and silver production, as compiled by the census, the Mint, and the Geological Survey, now harmonize; and they are more accurate than ever before, because their compilation has had the benefit of the combined knowledge, facilities, and experience of all three offices.

The statistics of imports and exports have been so reclassified that they harmonize with the census statistics of manufactures, and it is now possible to determine, for every great line of manufacture, with each recurring five-year census, just what



proportion of the product is exported and what proportion consumed at home.

The annual statistics of the lumber cut, required by the Forest Service, are now compiled by the Census Office in co-operation with the Forestry Bureau, and harmonize with the five-year censuses of the lumber industry. The statistics of fisheries are compiled in co-operation with the Fish Commission. A close working arrangement exists between the census and the Inter-State Commerce Commission in the compilation of the statistics of transportation. In agricultural statistics the Census Bureau and the Bureau of Statistics of the Department of Agriculture now interchange information and work together instead of seeking to discredit each other's figures, as was formerly the case. The Geological Survey and the Census Office unite in collecting the statistics of mining. Arrangements are pending for similar co-operation with the Bureau of Education. I might illustrate by a number of additional instances.

Until there was a permanent Census Office, this co-ordination and correlation of government statistics was impossible, because there was no bureau of the government whose business it was to bring it about.

Curiously enough, it is a reason for the existence of a permanent office which was not even thought of when the bill for its establishment was under consideration in Congress.

But it is not alone in federal statistics that this good work is progressing. The Census Office is in more or less intimate touch with the statistical bureaus of all the States; and the work of standardizing their schedules of inquiry and their presentation of data has made rapid progress.

Quite as important is the census work in the standardizing of vital statistics. The United States is behind, and far behind, every other great civilized nation—including Japan—in the field of vital statistics,—the field that touches the people most closely because of its intimate relation to the public health. As to births, we have no registration whatever of which any effective use can be made. As to deaths, but few of the States

have possessed effective registration laws until recently. Formerly the laws differed widely in scope and requirement, and the returns under them were impossible of scientific classification. In the brief interval since the census has been at work in this field, it has secured the adoption of its "standard certificate" of deaths in practically the entire registration area, thus making it possible, for the first time, to accurately judge the health conditions of one community by comparison with those in others. No single step ever taken by a federal bureau meant so much for the future physical welfare and sanitary protection of the American people as the successful introduction of this "standard certificate." If we had done nothing else, we would still have justified our existence by this single achievement. Moreover, largely as the result of an earnest propaganda by the Census Office, the number of States and cities in which effective registration laws are efficiently administered has greatly increased. These States and cities contained a population of 30,765,618 in 1900, or 40.5 per cent. of the total population: now they represent a population of 36,846,981, or 48.5 per cent. of the total. We are hopeful that at least two great States of the Middle West will be added during the present winter.

A third field in which the census is blazing the way to standardization is that of public accounting. Confusion worse confounded exists in the methods of book-keeping which now prevail in State, city, town, and county governments. In whatever direction we turn, we find an absence of uniformity, a lack of system, a confusion of methods, which originated in the separate organization of independent States and independent communities within the States. The progress of our own peculiar civilization is conditional upon the gradual unification of these diverse and conflicting statutory and administrative anomalies in the book-keeping of public finances. The most prolific source of municipal graft, its securest hiding-place, its most effective agency in seeking immunity, is the chaos existing in municipal book-keeping and in the classification of municipal accounts.

To each of the 157 cities of the United States having a population of 30,000 and over, a representative of the census goes every year, and so classifies the receipts and expenditures for every purpose that each city now knows just what it costs, in comparison with the cost in other cities of its class, to maintain schools, police, fire department, streets, sewers,—every important item of municipal expense. This is a magnificent work, furnishing a most effective weapon in the crusade for municipal reform and rehabilitation now sweeping over the United States.

These are some of the directions in which the permanent Census Office has already been able to lay the foundation for the standardization of official statistics. Our plans contemplate the unification of these statistics at every point where the work of the census touches the statistical work of any bureau, board, or commission in any State, city, or county throughout the United States. To lead the way, by example, by co-operation, by advice, in reducing the huge mass of ill-arranged and discordant State and municipal statistics to an orderly and comparable basis, is a most important function of the permanent census.

These things make me confident that the outlook for statistical science, in its application to government work, is full of promise and encouragement. A definite, well-directed movement for the standardization of official statistics is under way, and has already made rapid progress. I believe this movement, in its far-reaching, practical results, to be the most important work now in progress in the government service. It needs the co-operation, encouragement, and active assistance of every one interested in statistical science. It has only just started; but it has got a good start, and it must not be permitted to go wrong. Goethe was not quite ready to admit that “figures govern the world.” But, if not true in his day, it is becoming true as time passes. In the kind of problems with which modern government has to deal, a column of figures may prove more potent than a column of soldiers, and a statistical table may exercise more influence than a flotilla of battleships!